Artham
Resource Material

For Revised Syllabus Session 2024-25

EXEMPLAR SOLUTIONS
SCIENCE

Chapter :Metals and Non-metals

Class
10

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Chapter 3
Metals and Non-metals

Multiple Choice Questions

1. Which of the following property is generally not shown by metals?
(a) Electrical conduction
(b) Sonorous in nature
(c) Dullness
(d) Ductility

Soln:

Answer is (c) Dullness

2. The ability of metals to be drawn into thin wire is known as
(a) ductility
(b) malleability
(c) sonorousity
(d) conductivity

Soln:

Answer is (a) ductility

Explanation:

- Ductility is property of metals to be drawn into thin wire.
- Malleability is property of metals to be drawn into thin wire
- Sonorousity is the ability of metal to be sonorous in nature
- Conductivity is the ability to conduct electricity

3. Aluminium is used for making cooking utensils. Which of the following properties of aluminium are responsible for the same?
(i) Good thermal conductivity
(ii) Good electrical conductivity
(iii) Ductility
(iv) High melting point

(a) (i) and (ii)
(b) (i) and (iii)
(c) (ii) and (iii)
(d) (i) and (iv)

Soln:

Answer is (d) (i) and (iv)

Explanation:

Ductility and electric conductivity has no relation to cooking hence thermal conductivity and high melting point are the right answers.

4. Which one of the following metals do not react with cold as well as hot water?
(a) Na
(b) Ca
(c) Mg
(d) Fe

Soln:

Answer is (d) Fe

Explanation:

Sodium and Calcium reacts vigorously with water and Magnesium reacts with hot water to form Magnesium Oxide. Iron does not react with cold and hot water but it reacts with steam.

5. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?
(a) FeO
(b) Fe2O3
(c) Fe3O4
(d) Fe2O3 and Fe3O4

Soln:

Answer is (c) Fe3O4

Explanation:

$3Fe+4H_2O \quad Fe_3O4+4H_2$

6. What happens when calcium is treated with water?
(i) It does not react with water
(ii) It reacts violently with water
(iii) It reacts less violently with water
(iv) Bubbles of hydrogen gas formed stick to the surface of calcium

(a) (i) and (iv)
(b) (ii) and (iii)
(c) (i) and (ii)
(d) (iii) and (iv)

Soln:

Answer is (d) (iii) and (iv)

Explanation:

Calcium reacts vigorously with water and forms hydrogen which will make calcium to float.

7. Generally metals react with acids to give salt and hydrogen gas. Which of the following acids does not give hydrogen gas on reacting with metals (except Mn and Mg)?
(a) $H_2 SO_4$
(b) HCl
(c) HNO_3
(d) All of these

Soln:

Answer is (c) HNO_3

Explanation:

Nitric acid is a powerful oxidizing agent. It reacts with metal to form water.

8. The composition of aqua-regia is

(a) Dil.HCl : Conc. HNO_3 3 : 1
(b) Conc.HCl : Dil. HNO_3 3 : 1
(c) Conc.HCl : Conc.HNO_3 3 : 1
(d) Dil.HCl : Dil.HNO_3 3 : 1

Soln:

Answer is (c) Conc.HCl : Conc.HNO_3 3 : 1

9. Which of the following are not ionic compounds?
(i) KCl
(ii) HCl
(iii) CCl_4
(iv) NaCl

(a) (i) and (ii)
(b) (ii) and (iii)
(c) (iii) and (iv)
(d) (i) and (iii)

Soln:

Answer is (b) (ii) and (iii)

Explanation:

HCl and CCl4 are covalent compound hence they cannot be ionic.

10. Which one of the following properties is not generally exhibited by ionic compounds?
(a) Solubility in water
(b) Electrical conductivity in solid state
(c) High melting and boiling points
(d) Electrical conductivity in molten state

Soln:

Answer is (b) Electrical conductivity in solid state

Explanation:

In ionic compound free ions are not available in solid state hence solid ionic compounds cannot conduct electricity.

11. Which of the following metals exist in their native state in nature?

(i) Cu
(ii) Au
(iii) Zn
(iv) Ag

(a) (i) and (ii)
(b) (ii) and (iii)
(c) (ii) and (iv)
(d) (iii) and (iv)

Soln:

Answer is (c) (ii) and (iv)

Explanation:

Gold and silver are non-reactive metals because of they are non-reactive they exist in native state in nature.

12. Metals are refined by using different methods. Which of the following metals are refined by electrolytic refining?
(i) Au
(ii) Cu
(iii) Na
(iv) K

(a) (i) and (ii)
(b) (i) and (iii)
(c) (ii) and (iii)
(d) (iii) and (iv)

Soln:

Answer is (d) (iii) and (iv)

Explanation:

Sodium and potassium are at the top in reactivity series hence they can be refined by electrolytic refining.

13. Silver articles become black on prolonged exposure to air. This is due to the formation of
(a) Ag_3N
(b) Ag_2O
(c) Ag_2 S
(d) Ag_2S and Ag3N

Soln:

Answer is (c) Ag_2S

Explanation:

Silver metal reacts with sulphur present in the atmosphere to form Ag_2S. Ag2S is responsibkle foer black coloration of silver articles.

14. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of
(a) Gallium
(b) Aluminium
(c) Zinc
(d) Silver

Soln:

Answer is(c) Zinc

Explanation:

Galvanization is a process of applying a layer of Zinc on iron by using electrolysis.

15. Stainless steel is very useful material for our life. In stainless steel, iron is mixed with
(a) Ni and Cr
(b) Cu and Cr
(c) Ni and Cu
(d) Cu and Au

Soln:

Answer is (a) Ni and Cr

Explanation :

Stainless steel is an alloy of Iron, Nicker and chromium. This alloy makes the metal strong, durable and corrosion resistant.

16. If copper is kept open in air, it slowly loses its shining brown surface and gains a green coating. It is due to the formation of
(a) $CuSO_4$
(b) $CuCO_3$
(c) $Cu(NO_3)_2$
(d) CuO

Soln:

Answer is (d) CuO

Explanation:

On exposure to air copper reacts to atmospheric oxygen to form copper oxide layer which is green in color.

17. Generally, metals are solid in nature. Which one of the following metals is found in liquid state at room temperature?
(a) Na
(b) Fe
(c) Cr
(d) Hg

Soln:

Answer is (d) Hg

18. Which of the following metals are obtained by electrolysis of their chlorides in molten state ?
(i) Na
(ii) Ca
(iii) Fe
(iv) Cu

(a) (i) and (iv)
(b) (iii) and (iv)
(c) (i) and (iii)
(d) (i) and (ii)

Soln:

Answer is (d) (i) and (ii)

Explanation:

Sodium and Calcium are in the top in reactivity series

19. Generally, non-metals are not lustrous. Which of the following nonmetal is lustrous?
(a) Sulphur
(b) Oxygen
(c) Nitrogen
(d) Iodine

Soln:

Answer is (d) Iodine

20. Which one of the following four metals would be displaced from the solution of its salts by other three metals?
(a) Mg
(b) Ag
(c) Zn
(d) Cu

Soln:

Answer is (b) Ag

Explanation:

Because silver is a non-reactive metal it can be displaced easily.

21. 2 mL each of concentrated HCl, HNO3 and a mixture of concentrated HCl and concentrated HNO3 in the ratio of 3 : 1 were taken in test tubes labelled as A, B and C. A small piece of metal was put in each test tube. No change occurred in test tubes A and B but the metal got dissolved in test tube C respectively. The metal could be

(a) Al
(b) Au
(c) Cu
(d) Pt

Soln:

Answer is (b) Au

Explanation:

Answer is gold because solution C is mixture of Concentrated HCL and Concentrated HNO_3 which is called aqua rezia. Aqua Rezia dissolves gold.

22. An alloy is
(a) an element
(b) a compound
(c) a homogeneous mixture
(d) a heterogeneous mixture

Soln:

Answer is (c) a homogeneous mixture

Explanation:

An Alloy is a homogeneous mixture because its composition is uniform.

23. An electrolytic cell consists of
(i) positively charged cathode
(ii) negatively charged anode
(iii) positively charged anode
(iv) negatively charged cathode

(a) (i) and (ii)
(b) (iii) and (iv)
(c) (i) and (iii)
(d) (ii) ad (iv)

Soln:

Answer is (b) (iii) and (iv)

24. During electrolytic refining of zinc, it gets
(a) deposited on cathode
(b) deposited on anode
(c) deposited on cathode as well as anode
(d) remains in the solution

Soln:

Answer is (a) deposited on cathode

Explanation:

Zinc is positively charged hence it moves towards negatively charged cathode.

25. An element A is soft and can be cut with a knife. This is very reactive to air and cannot be kept open in air. It reacts vigorously with water. Identify the element from the following

(a) Mg
(b) Na
(c) P
(d) Ca

Soln:

Answer is (b) Na

Explanation:

Sodium is soft which can be cut with a knife. Sodium reacts with water and air vigorously hence it is kept in kerosene.

26. Alloys are homogeneous mixtures of a metal with a metal or nonmetal. Which among the following alloys contain non-metal as one of its constituents?
(a) Brass
(b) Bronze
(c) Amalgam
(d) Steel

Soln:

Answer is (d) Steel

Explanation:

Steel is an alloy made up of carbon and iron where carbon is a non-metal.

27. Which among the following statements is incorrect for magnesium metal?
(a) It burns in oxygen with a dazzling white flame
(b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas
(c) It reacts with hot water to form magnesium hydroxide and evolves hydrogen gas
(d) It reacts with steam to form magnesium hydroxide and evolves hydrogen gas

Soln:

Answer is (b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas

Explanation:

Magnessium reacts with cold water to form magnesium oxide and evolves hydrogen gas is a wrong statement because Magnessium Hydroxide is formed not Magnessium oxide.

28. Which among the following alloys contain mercury as one of its constituents?
(a) Stainless steel
(b) Alnico
(c) Solder
(d) Zinc amalgam

Soln:

Answer is (d) Zinc amalgam

Explanation:

Zinc amalgam is an alloy of Mercury and Zinc

29. Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?
(a) Has high melting point
(b) Has low melting point
(c) Conducts electricity in molten state
(d) Occurs as solid

Soln:

Answer is (b) Has low melting point

Explanation:

Here Z is an ionic compound and Ionic compounds have melting point hence option b) is a wrong statement.

30. The electronic configurations of three elements X, Y and Z are X — 2, 8; Y — 2, 8, 7 and Z — 2, 8, 2. Which of the following is correct?
(a) X is a metal
(b) Y is a metal
(c) Z is a non-metal
(d) Y is a non-metal and Z is a metal

Soln:

Answer is (d) Y is a non-metal and Z is a metal

Explanation:

Element Y has 3 electron in its outer which is electronegative in nature. Z has 2 electrons in its outermost shell hence it is electropositive. Hence it is a metal.

31. Although metals form basic oxides, which of the following metals form an amphoteric oxide?
(a) Na
(b) Ca
(c) Al
(d) Cu

Soln:

Answer is (c) Al

Explanation:

Oxides of Aluminum are both acidic and basic in nature. Hence aluminum oxides are amphoteric in nature.

32. Generally, non-metals are not conductors of electricity. Which of the following is a good conductor of electricity?
(a) Diamond
(b) Graphite
(c) Sulphur
(d) Fullerene

Soln:

Answer is (b) Graphite

33. Electrical wires have a coating of an insulting material. The material, generally used is
(a) Sulphur
(b) Graphite
(c) PVC
(d) All can be used

Soln:

Answer is (c) PVC

Explanation:

Sulphur is brittle in nature, hence it can be used and Graphite is a good conductor of electricity hence it cannot be used as insulator.

34. Which of the following non-metals is a liquid?
(a) Carbon
(b) Bromine
(c) Phosphorus
(d) Sulphur

Soln:

Answer is (b) Bromine

35. Which of the following can undergo a chemical reaction?
(a) $MgSO_4$ + Fe
(b) $ZnSO_4$ + Fe
(c) $MgSO_4$ + Pb
(d) $CuSO_4$ + Fe

Soln:

Answer is (d) $CuSO_4$ + Fe

Explanation:

Iron is more reactive than copper hence it displaces copper in the reaction to form Feso$_4$.

36. Which one of the following figures correctly describes the process of electrolytic refining?

of electrolytic refining?

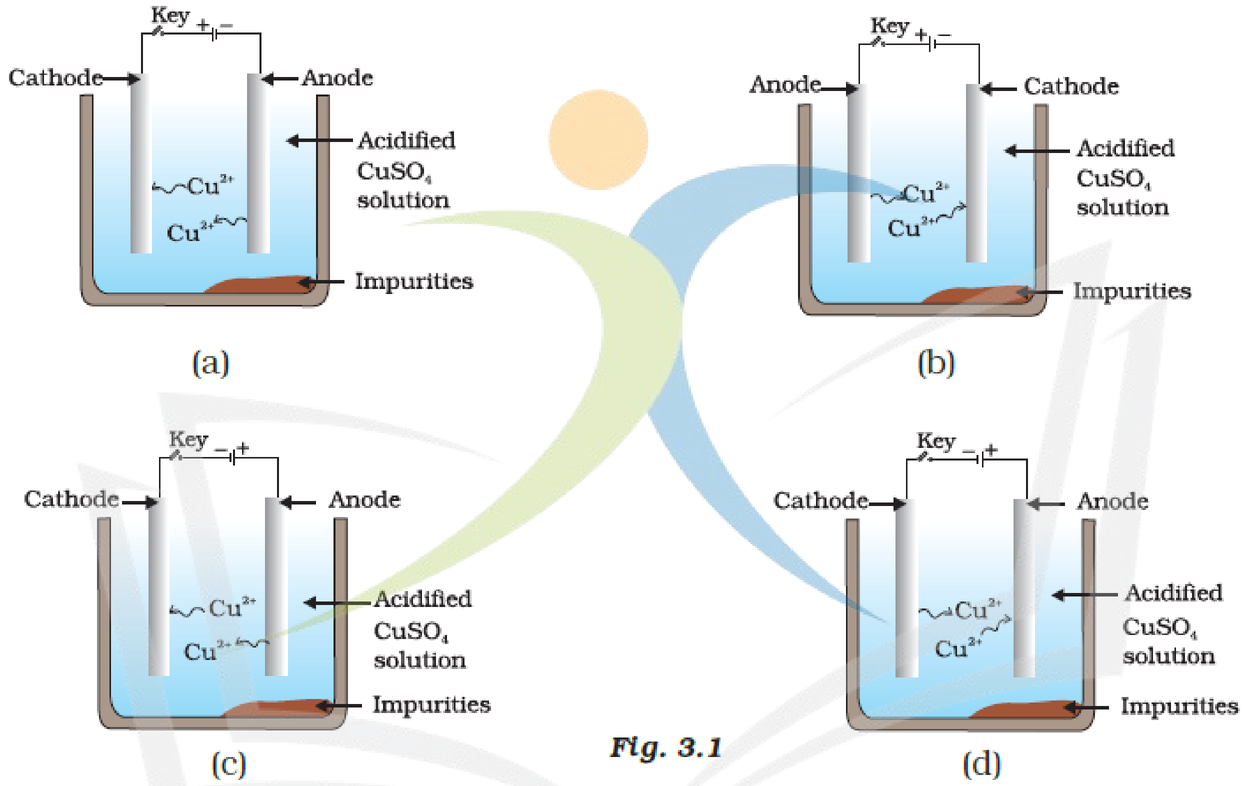


Fig. 3.1

Soln:

Answer is b)

Explanation:

Copper ions are dispersed from positively charged anode and deposited on negatively charged cathode.

Short Answer Questions

37. Iqbal treated a lustrous, divalent element M with sodium hydroxide. He observed the formation of bubbles in reaction mixture. He made the same observations when this element was treated with hydrochloric acid. Suggest how can he identify the produced gas. Write chemical equations for both the reactions.

Soln:

To identify the produced gas, lighted matchstick should be brought near the gas. If match stick burns with pop sound, it indicates the evolution of Hydrogen gas.

$M + 2NaOH \longrightarrow Na_2MO_2 + H_2$

With HCl

$M + 2HCl \longrightarrow MCl_2 + H_2$

38. During extraction of metals, electolytic refining is used to obtain pure metals. (a) Which material will be used as anode and cathode for refining of silver metal by this process? (b) Suggest a suitable electrolyte also. (c) In this electrolytic cell, where do we get pure silver after passing electric current?

Soln:

a) During extraction of metals, impure metal will be used as anode and pure metal is used as cathode for refining of silver metal by this electrolytic refining.
b) Silver Sulphate or Silver Nitrate
c) Pure silver is obtained on cathode

39. Why should the metal sulphides and carbonates be converted to metal oxides in the process of extraction of metal from them?

Soln:

Metal sulphides and carbonates are converted to metal oxides in the process of extraction of metal from them because metals can be obtained easier in oxide form than its sulphide or carbonate form.

40. Generally, when metals are treated with mineral acids, hydrogen gas is liberated but when metals (except Mn and Mg), treated with HNO_3 , hydrogen is not liberated, why?

Soln:

HNO_3 is a strong oxidizing agent. It oxidises the liberated Hydrogen into water while converting itself to nitrogen oxide.

41. Compound X and aluminium are used to join railway tracks. (a) Identify the compound X (b) Name the reaction (c) Write down its reaction.

Soln:

a) Answer is Fe_2O_3
b) Involved reaction is a thermite reaction which is also called as aluminothermy
c) $Fe_2O_3(s) + 2Al(s) \rightarrow Al_2O_3(s) + 2Fe(s)$ + Heat Ferric oxide Aluminium Aluminium Iron Oxide.

42. When a metal X is treated with cold water, it gives a basic salt Y with molecular formula XOH (Molecular mass = 40) and liberates a gas Z which easily catches fire. Identify X, Y and Z and also write the reaction involved.

Soln:

X is Na because molecular mass of NaOH is 40.
Hence Y is NaOH

Z is hydrogen has which catches fire when reacts with water.

$2Na+2H_2O \longrightarrow 2NaOH+H_2$

43. A non-metal X exists in two different forms Y and Z. Y is the hardest natural substance, whereas Z is a good conductor of electricity. Identify X, Y and Z.

Soln:

X is Carbon, Y and Z are Diamond and Graphite which are allotropes of the carbon.

44. The following reaction takes place when aluminium powder is heated with MnO_2
$3 MnO_2 (s) + 4 Al (s) \rightarrow 3 Mn (l) + 2 Al_2O_3 (l)$ + Heat
(a) Is aluminium getting reduced? (b) Is MnO_2 getting oxidised?

Soln:

In this reaction aluminium gets oxidized as oxygen gets combined with it. Since oxygen is removed from MnO_2 it is getting reduced.

45. What are the constituents of solder alloy? Which property of solder makes it suitable for welding electrical wires?

Soln:

Solder alloy is made of Lead and aluminium. Its low melting point makes it suitable for welding electrical wires.

46. A metal A, which is used in thermite process, when heated with oxygen gives an oxide B, which is amphoteric in nature. Identify A and B. Write down the reactions of oxide B with HCl and NaOH.

Soln:

Metal A is Aluminium and B is Al_2O_3

With HCl

$Al_2O_3 + 6HCl \longrightarrow 2AlCl_3 + 3H_2O$

With NaOH

$Al_2O_3 + 2NaOH \longrightarrow 2NaAlO2 + H2O$

47. A metal that exists as a liquid at room temperature is obtained by heating its sulphide in the presence of air. Identify the metal and its ore and give the reaction involved.

Soln:

Mercury is the metal which is liquid at room temperature. Ore of Mercury is Cinnabar. When we heat cinnabar in atmospheric oxygen following reaction takes place.

$2HgS + 3O_2 \longrightarrow 2HgO + 2SO_2$

Mercuric oxide is again heated to get Mercury and Oxygen

$2HgO \xrightarrow{heat} Hg + O_2$

48. Give the formulae of the stable binary compounds that would be formed by the combination of following pairs of elements.
(a) Mg and N2
(b) Li and O2
(c) Al and Cl2
(d) K and O2

Soln:

a) Magnessium Nitride (Mg_3N_2)
b) Lithium Oxide(Li_2O)
c) Aluminium Chloride($AlCl_3$)
d) Potassium Oxide (K_2O)

49. What happens when
(a) ZnCO3 is heated in the absence of oxygen?
(b) a mixture of Cu2O and Cu2S is heated?

Soln:

a) When ZnCO3 is heated in the absence of oxygen Zinc Oxide and Carbon-di-oxide are liberated.
$ZnCo_3 \longrightarrow ZNO + CO_2$

b) When a mixture of Cu2O and Cu2S is heated we get pure copper
2 Cu2O+ Cu2S $\longrightarrow$ 6Cu+SO_2

50. A non-metal A is an important constituent of our food and forms two oxides B and C. Oxide B is toxic whereas C causes global warming
(a) Identify A, B and C
(b) To which Group of Periodic Table does A belong?

Soln:
a) A is Carbon. B is Carbon monoxide C is Carbon-dioxide
b) Group 14

51. Give two examples each of the metals that are good conductors and poor conductors of heat respectively.

Soln:

Good conductors- Iron and Copper
Bad conductors- Lead and Mercury

52. Name one metal and one non-metal that exist in liquid state at room temperature. Also name two metals having melting point less than 310 K (37°C)

Soln:

Mercury and Bromine are liquid at room temperature. Caesium and Gallium are the metals whose melting point is less than 310K(37°c).

53. An element A reacts with water to form a compound B which is used in white washing. The compound B on heating forms an oxide C which on treatment with water gives back B. Identify A, B and C and give the reactions involved.

Soln:

A is calcium, B is calcium Hydroxide and C is Calcium Oxide.

$Ca+2H_2O \longrightarrow Ca(OH)_2+ H_2$

$Ca(OH)_2 \longrightarrow CaO+H_2O$

$CaO+H_2O \longrightarrow Ca(OH)_2$

54. An alkali metal A gives a compound B (molecular mass = 40) on reacting with water. The compound B gives a soluble compound C on treatment with aluminium oxide. Identify A, B and C and give the reaction involved.

Soln:

A is sodium and B is Sodium Hydroxide. Because molecular mass of NaOH is 40. So C is Sodium Aluminate.

$Al_2O_3 +2NaOH \longrightarrow 2NaAlO_2+H_2O$

55. Give the reaction involved during extraction of zinc from its ore by (a) roasting of zinc ore (b) calcination of zinc ore

Soln:

a) $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$.

b) $ZnCo_3 \rightarrow ZnO+CO$

56. A metal M does not liberate hydrogen from acids but reacts with oxygen to give a black colour product. Identify M and black coloured product and also explain the reaction of M with oxygen.

Soln:

Copper is the metal which does not react with acids. With oxygen it forms Copper Oxide.

Metal M is Copper and black colored product is Copper oxide.

$2Cu+ O_2 \longrightarrow 2CuO$

57. An element forms an oxide A2O3 which is acidic in nature. Identify A as a metal or non-metal.

Soln:

A is a non-metal because oxides of non-metals are acidic in nature.

58. A solution of CuSO4 was kept in an iron pot. After few days the iron pot was found to have a number of holes in it. Explain the reason in terms of reactivity. Write the equation of the reaction involved.

Soln:

Iron is more reactive than copper hence Iron displaces Copper to produce $FeSO_4$. In this process a portion of Iron Gets dissolved which results in Holes in the pot.

$Fe + CuSO_4 \longrightarrow FeSO_4 + Cu$

Long Answer Questions

59. A non-metal A which is the largest constituent of air, when heated with H2 in 1:3 ratio in the presence of catalyst (Fe) gives a gas B. On heating with O2 it gives an oxide C. If this oxide is passed into water in the presence of air it gives an acid D which acts as a strong oxidising agent.
(a) Identify A, B, C and D
(b) To which group of periodic table does this non-metal belong?

Soln:

a)
Non-metal a is nitrogen because it is the largest constituent of air which constitute around 78% of the gases.. B is Ammonia, C is Nitrogen-di-oxide and D is Nitric acid.

When heated with H2 in 1:3 ratio in the presence of catalyst (Fe) following reaction takes place.

$3N_2 + 3H_2 \longrightarrow 2NH_3$

On heating Nitrogen with O2 it gives nitrogen-di-oxide

$N_2 + 3O \longrightarrow 2NO_2$

When nitrogen-di-oxide is passed into water in the presence of air it gives an Nitric acid

$NO_2 + H_2O \longrightarrow HNO_3$

b)
Nitrogen belong to group 15

60. Give the steps involved in the extraction of metals of low and medium reactivity from their respective sulphide ores.

Soln:

During the extraction of metals of low and medium reactivity from their respective sulphide ores.
They are first heated in presence of atmospheric oxygen. This step will give out oxides of metal. This step is used as it is more efficient method to extract methods.

Ex: Cinnabar is heated in air to get mercuric sulphide oxidize to produce mercuric oxide.

$2HgS+3O_2 \longrightarrow 2HgO+2SO_2$

Mercuric oxide is further heat to get Mercury

$2HgO \longrightarrow 2Hg+O_2$

Zinc is a metal of medium reactivity and its ore is Zinc Blende

Zinc Blend is roasted to get Zinc oxide

$2ZnS+3O_2 \longrightarrow 2ZnO+2SO_2$

$ZNCO_3 \longrightarrow ZnO+ CO_2$

Zinc oxide when heated wit CO_2 Zinc is obtained

$ZnO+C \longrightarrow Zn+CO$

61. Explain the following
(a) Reactivity of Al decreases if it is dipped in HNO3
(b) Carbon cannot reduce the oxides of Na or Mg
(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state
(d) Iron articles are galvanised.
(e) Metals like Na, K, Ca and Mg are never found in their free state in nature.

Soln:

a) Reactivity of Aluminium decreases if it is dipped in HNO_3 because HNO_3 is a strong oxidizing agent. Here a layer a layer of aluminium oxide gets deposited because of which reactivity of alumnium gets reduced .

(b) Carbon cannot reduce the oxides of Na or Mg because these are highly reactive metals. Na and Mg have higher affinity to oxygen than carbon. Hence carbon fails to reduce the oxides of Na and Mg.

(c) NaCl is not a conductor of electricity in solid state whereas it does conduct electricity in aqueous solution as well as in molten state because NaCl is an ionic compound. Ionic compounds cannot conduct electricity in solid state but they can conduct electricity in aqueous solution and in molten state.

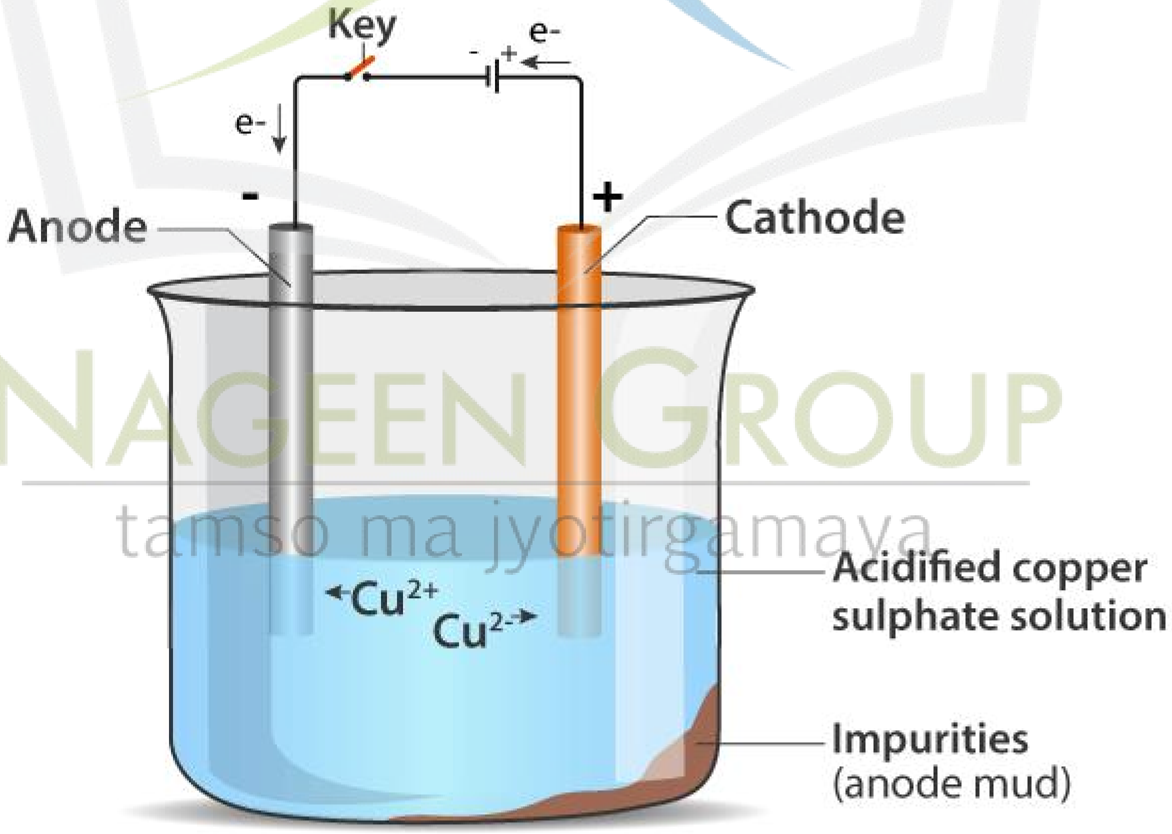
d) Iron readily reacts with atmospheric oxygen and forms rust. To avoid rusting of iron it is galvanized.

e) Metals like Na, K, Ca and Mg are are highly reactive metals. They can form compounds with almost every element . Because of this they are not found in their native form in nature.

62. (i) Given below are the steps for extraction of copper from its ore. Write the reaction involved.
(a) Roasting of copper (1) sulphide
(b) Reduction of copper (1) oxide with copper (1) sulphide.
(c) Electrolytic refining
(ii) Draw a neat and well labelled diagram for electrolytic refining of copper

Soln:

a) $2Cu_2S+3O_2 \longrightarrow 2Cu_2O+SO_2$
b) $2Cu_2O+ Cu_2S \longrightarrow 6Cu+ SO_2$
c) $Cu^{+2+}2e^{-} \longrightarrow Cu$



63. Of the three metals X, Y and Z. X reacts with cold water, Y with hot water and Z with steam only. Identify X, Y and Z and also arrange them in order of increasing reactivity.

Soln:

X reacts with cold water.
Hence , the element should be Sodium

$Ca + H_2O \longrightarrow Ca(OH)_2 + H_2$

Y reacts with hotwater, Hence, it is "Magnesium"

$Mg + H_2O \longrightarrow Mg(OH)_2 + H_2$

Z reacts with steam only. Hence , it is Iron

$Fe + H_2O \longrightarrow Fe_2O_3 + H_2$

Arranging in ascending order (increasing order of reactivity)

$Fe < Mg < Ca$

64. An element A burns with golden flame in air. It reacts with another element B, atomic number 17 to give a product C. An aqueous solution of product C on electrolysis gives a compound D and liberates hydrogen. Identify A, B, C and D. Also write down the equations for the reactions involved.

Soln:

Element A is 17 Sodium because it will burn with golden flame in air.

Element B is Chlorine for its atomic number is 17.

Product C is Sodium Chloride

$2Na + CL_2 \longrightarrow 2NaCl$

Product D is Sodium hydroxide

$2NaCl + 2H_2O \qquad 2NaOH + Cl_2 + H_2$

65. Two ores A and B were taken. On heating ore A gives CO2 whereas, ore B gives SO2 . What steps will you take to convert them into metals?

Soln:

Ore A gives CO2 on heating hence it is a carbonate ore

Steps involved in Extraction of ore A

a) Calcination

Ore is heated in limited supply of air to obtain metal oxide

$ACO_3 \longrightarrow AO + CO_2$

b) Reduction

Metal oxide is reduced with coke to obtain metal.

$AO + C \longrightarrow A + CO$

Ore B is a sulphide ore

Steps involved in extraction of element B are

a) Roasting

Ore is heated in presence of air to obtain metal oxide

$2BS + 3O_2 \longrightarrow 2BO + 2SO_2$

b) Reduction

Metal oxide is reduced to metal by carbon

$BO + C \longrightarrow B + CO$

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We are thrilled to introduce the School of Educators WhatsApp Group, a platform designed exclusively for educators to enhance your teaching & Learning experience and learning outcomes. Here are some of the key benefits you can expect from joining our group:

BENEFITS OF SOE WHATSAPP GROUPS

- **Abundance of Content:** Members gain access to an extensive repository of educational materials tailored to their class level. This includes various formats such as PDFs, Word files, PowerPoint presentations, lesson plans, worksheets, practical tips, viva questions, reference books, smart content, curriculum details, syllabus, marking schemes, exam patterns, and blueprints. This rich assortment of resources enhances teaching and learning experiences.

- **Immediate Doubt Resolution:** The group facilitates quick clarification of doubts. Members can seek assistance by sending messages, and experts promptly respond to queries. This real-time interaction fosters a supportive learning environment where educators and students can exchange knowledge and address concerns effectively.

- **Access to Previous Years' Question Papers and Topper Answers:** The group provides access to previous years' question papers (PYQ) and exemplary answer scripts of toppers. This resource is invaluable for exam preparation, allowing individuals to familiarize themselves with the exam format, gain insights into scoring techniques, and enhance their performance in assessments.

- **Free and Unlimited Resources:** Members enjoy the benefit of accessing an array of educational resources without any cost restrictions. Whether its study materials, teaching aids, or assessment tools, the group offers an abundance of resources tailored to individual needs. This accessibility ensures that educators and students have ample support in their academic endeavors without financial constraints.

- **Instant Access to Educational Content:** SOE WhatsApp groups are a platform where teachers can access a wide range of educational content instantly. This includes study materials, notes, sample papers, reference materials, and relevant links shared by group members and moderators.

- **Timely Updates and Reminders:** SOE WhatsApp groups serve as a source of timely updates and reminders about important dates, exam schedules, syllabus changes, and academic events. Teachers can stay informed and well-prepared for upcoming assessments and activities.

- **Interactive Learning Environment:** Teachers can engage in discussions, ask questions, and seek clarifications within the group, creating an interactive learning environment. This fosters collaboration, peer learning, and knowledge sharing among group members, enhancing understanding and retention of concepts.

- **Access to Expert Guidance:** SOE WhatsApp groups are moderated by subject matter experts, teachers, or experienced educators can benefit from their guidance, expertise, and insights on various academic topics, exam strategies, and study techniques.

Join the School of Educators WhatsApp Group today and unlock a world of resources, support, and collaboration to take your teaching to new heights. To join, simply click on the group links provided below or send a message to +91-95208-77777 expressing your interest.

Together, let's empower ourselves & Our Students and inspire the next generation of learners.

Best Regards,
Team
School of Educators

Join School of Educators WhatsApp Groups

You will get Pre- Board Papers PDF, Word file, PPT, Lesson Plan, Worksheet, practical tips and Viva questions, reference books, smart content, curriculum, syllabus, marking scheme, toppers answer scripts, revised exam pattern, revised syllabus, Blue Print etc. here . Join Your Subject / Class WhatsApp Group.

Kindergarten to Class XII (For Teachers Only)

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Class 1

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Class 3

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Class 4

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Class 7

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Class 9

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Class 10

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Class 11 (Science)

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Class 12 (Science)

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Class 12 (Commerce)

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Kindergarten

Subject Wise Secondary and Senior Secondary Groups (IX & X For Teachers Only)

Secondary Groups (IX & X)

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IT Code-402

Click Here to Join
Hindi-B

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Artificial Intelligence

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Accountancy

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Economics

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BST

Click Here to Join
History

Click Here to Join

Geography

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Sociology

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Hindi Elective

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Hindi Core

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Home Science

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Sanskrit

Click Here to Join

Psychology

Click Here to Join

Political Science

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Painting

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Vocal Music

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Comp. Science

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IP

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Physical Education

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APP. Mathematics

Click Here to Join

Legal Studies

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Entrepreneurship

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French

Click Here to Join

IT

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Other Important Groups (For Teachers & Principal’s)

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Principal’s Group

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Teachers Jobs

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IIT/NEET

Join School of Educators WhatsApp Groups

You will get Pre- Board Papers PDF, Word file, PPT, Lesson Plan, Worksheet, practical tips and Viva questions, reference books, smart content, curriculum, syllabus, marking scheme, toppers answer scripts, revised exam pattern, revised syllabus, Blue Print etc. here . Join Your Subject / Class WhatsApp Group.

Kindergarten to Class XII (For Students Only)

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Class 10

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Class 11 (Science)

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Class 11 (Humanities)

Click Here to Join
Class 11 (Commerce)

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Class 12 (Science)

Click Here to Join
Class 12 (Humanities)

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Class 12 (Commerce)

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(VI TO VIII)

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Hindi

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Click Here to Join
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Sociology

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Hindi Elective

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Hindi Core

Click Here to Join
Home Science

Click Here to Join
Sanskrit

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Psychology

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Political Science

Click Here to Join
Painting

Click Here to Join
Music

Click Here to Join
Comp. Science

Click Here to Join
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Physical Education

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Legal Studies

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Entrepreneurship

Click Here to Join
French

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IT

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AI

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IIT/NEET

Click Here to Join
CUET

Groups Rules & Regulations:

To maximize the benefits of these WhatsApp groups, follow these guidelines:

1. Share your valuable resources with the group.
2. Help your fellow educators by answering their queries.
3. Watch and engage with shared videos in the group.
4. Distribute WhatsApp group resources among your students.
5. Encourage your colleagues to join these groups.

Additional notes:

1. Avoid posting messages between 9 PM and 7 AM.
2. After sharing resources with students, consider deleting outdated data if necessary.
3. It's a NO Nuisance groups, single nuisance and you will be removed.
    - No introductions.
    - No greetings or wish messages.
    - No personal chats or messages.
    - No spam. Or voice calls
    - Share and seek learning resources only.

Please only share and request learning resources. For assistance, contact the helpline via WhatsApp: +91-95208-77777.

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Join our premium groups and just Rs. 1000 and gain access to all our exclusive materials for the entire academic year. Whether you're a student in Class IX, X, XI, or XII, or a teacher for these grades, Artham Resources provides the ultimate tools to enhance learning. Pay now to delve into a world of premium educational content!

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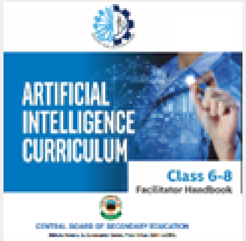
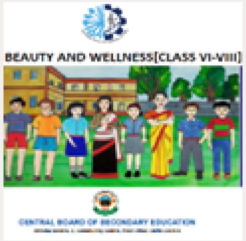
Best Wishes,

Team
School of Educators & Artham Resources

SKILL MODULES BEING OFFERED IN MIDDLE SCHOOL


ARTIFICIAL INTELLIGENCE CURRICULUM
Class 6-8
Facilitator Handbook
CENTRAL BOARD OF SECONDARY EDUCATION

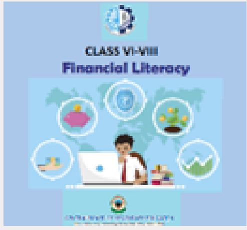
Artificial Intelligence


BEAUTY AND WELLNESS[CLASS VI-VIII]
CENTRAL BOARD OF SECONDARY EDUCATION

Beauty & Wellness

DESIGN THINKING&INNOVATION
CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

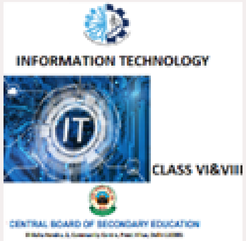
Design Thinking & Innovation


CLASS VI-VIII
Financial Literacy

Financial Literacy

HANDICRAFTS
CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

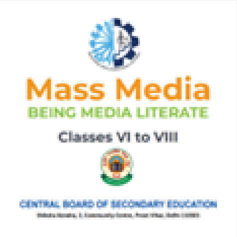
Handicrafts


INFORMATION TECHNOLOGY
CLASS VI&VIII
CENTRAL BOARD OF SECONDARY EDUCATION

Information Technology

MARKETING
Class VI - VIII
CENTRAL BOARD OF SECONDARY EDUCATION

Marketing/Commercial Application


Mass Media
BEING MEDIA LITERATE
Classes VI to VIII
CENTRAL BOARD OF SECONDARY EDUCATION

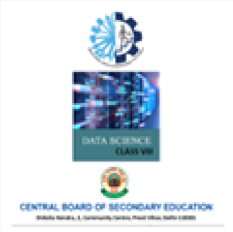
Mass Media - Being Media Literate

TRAVEL & TOURISM
CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

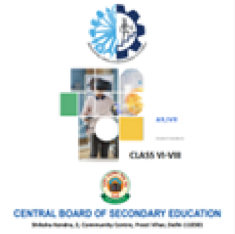
Travel & Tourism

CODING
CLASS VI-VIII

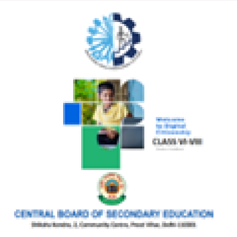
Coding


CENTRAL BOARD OF SECONDARY EDUCATION

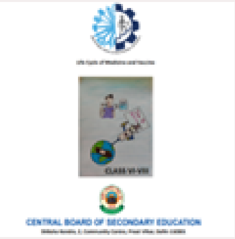
Data Science (Class VIII only)


CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

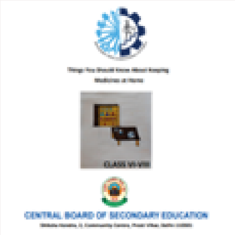
Augmented Reality / Virtual Reality


CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

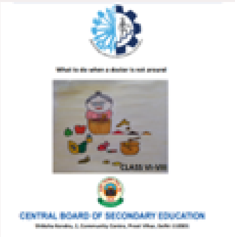
Digital Citizenship


CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

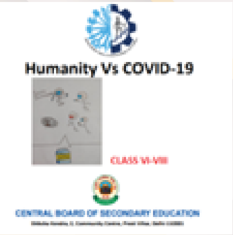
Life Cycle of Medicine & Vaccine


CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

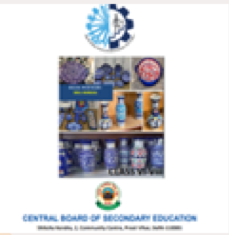
Things you should know about keeping Medicines at home


CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

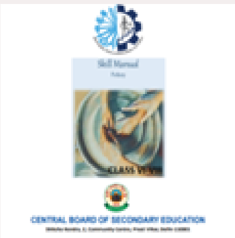
What to do when Doctor is not around


Humanity Vs COVID-19
CLASS VI-VIII
CENTRAL BOARD OF SECONDARY EDUCATION

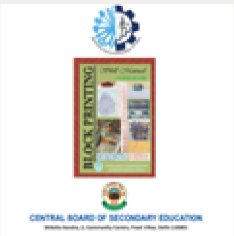
Humanity & Covid-19


CENTRAL BOARD OF SECONDARY EDUCATION

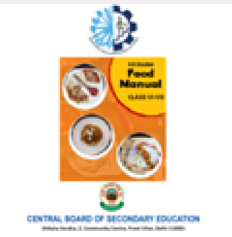
Blue Pottery

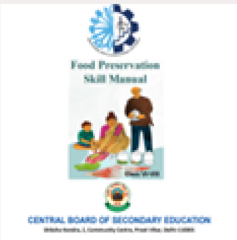

CENTRAL BOARD OF SECONDARY EDUCATION

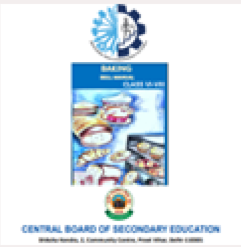
Pottery


BLOCK PRINTING
CENTRAL BOARD OF SECONDARY EDUCATION

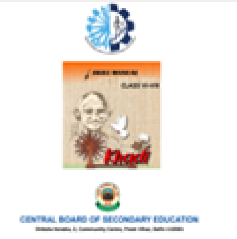
Block Printing

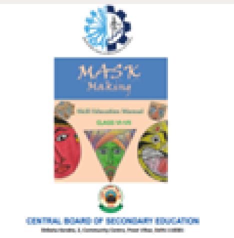

Food

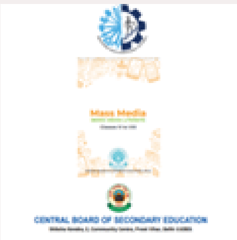

Food Preservation


Baking

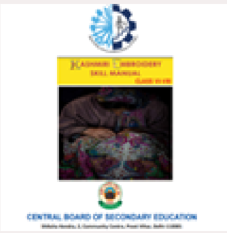
Herbal Heritage


Khadi

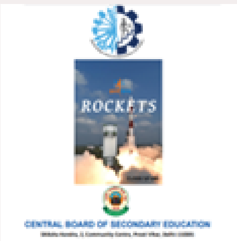

Mask Making

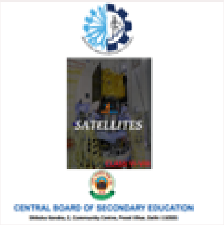

Mass Media

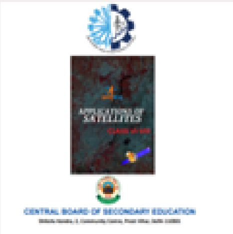
Making of a Graphic Novel

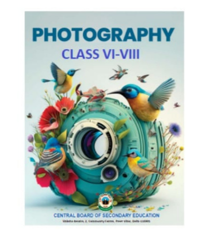

Kashmiri Embroidery

Embroidery


Rockets

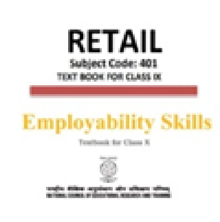

Satellites


Application of Satellites

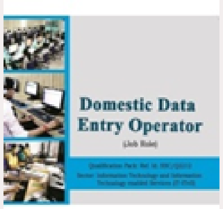

PHOTOGRAPHY
CLASS VI-VIII

Photography

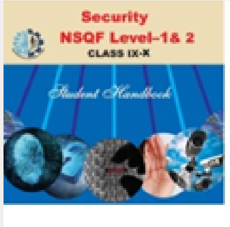
SKILL SUBJECTS AT SECONDARY LEVEL (CLASSES IX – X)


RETAIL
Subject Code: 401
TEXT BOOK FOR CLASS IX
Employability Skills
Textbook for Class X

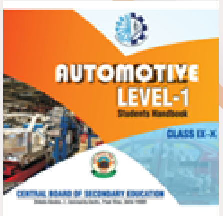
Retail


Domestic Data Entry Operator
(Job Role)

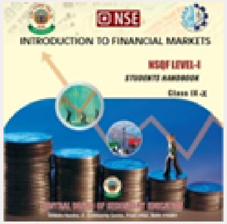
Information Technology


Security
NSQF Level-1& 2
CLASS IX-X
Student Handbook

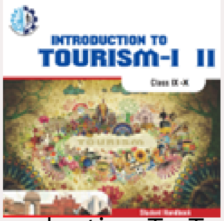
Security


AUTOMOTIVE
LEVEL-1
Students Handbook
CLASS IX-X
CENTRAL BOARD OF SECONDARY EDUCATION

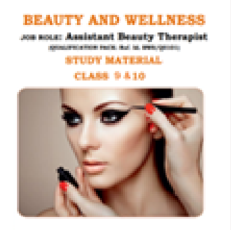
Automotive


NSE
INTRODUCTION TO FINANCIAL MARKETS
NSQF LEVEL-I
STUDENTS HANDBOOK
Class IX-X

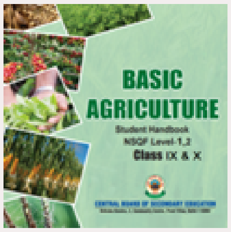
Introduction To Financial Markets


INTRODUCTION TO
TOURISM-I II
Class IX-X

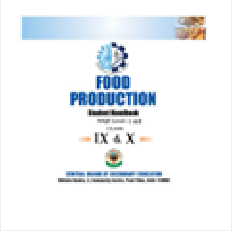
Introduction To Tourism


BEAUTY AND WELLNESS
JOB ROLE: Assistant Beauty Therapist
STUDY MATERIAL
CLASS 9 & 10

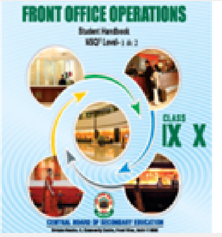
Beauty & Wellness


BASIC
AGRICULTURE
Student Handbook
NSQF Level-1,2
Class IX & X

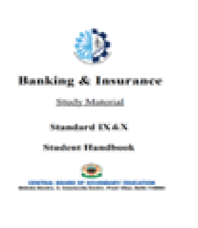
Agriculture


FOOD
PRODUCTION
Student Handbook
IX & X

Food Production


FRONT OFFICE OPERATIONS
Student Handbook
NSQF Level-1 & 2
CLASS
IX X

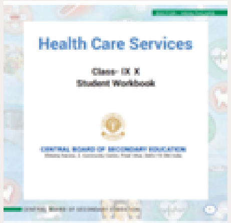
Front Office Operations


Banking & Insurance
Study Material
Standard IX & X
Student Handbook

Banking & Insurance

MARKETING
AND
SALES
Study Material
IX & X
Student Handbook

Marketing & Sales


Health Care Services
Class- IX X
Student Workbook
CENTRAL BOARD OF SECONDARY EDUCATION

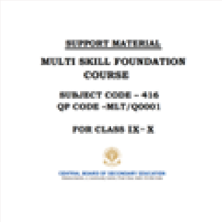
Health Care

Apparel
Hand Embroiderer
(Job Role)

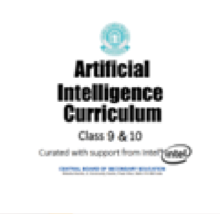
Apparel

STUDY MATERIAL
MEDIA (415)
JOB ROLE: Texturing Artist
CLASS - IX & X
Media & Entertainment Skills Council
CENTRAL BOARD OF SECONDARY EDUCATION

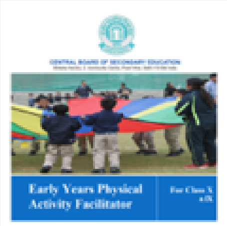
Multi Media


SUPPORT MATERIAL
MULTI SKILL FOUNDATION COURSE
SUBJECT CODE - 416
QP CODE -MLT/Q0001
FOR CLASS IX - X

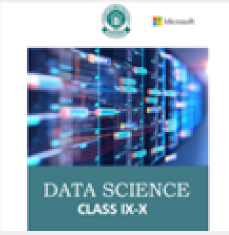
Multi Skill Foundation Course


Artificial
Intelligence
Curriculum
Class 9 & 10
Curated with support from intel

Artificial Intelligence


CENTRAL BOARD OF SECONDARY EDUCATION
Early Years Physical Activity Facilitator

Physical Activity Trainer


Microsoft
DATA SCIENCE
CLASS IX-X

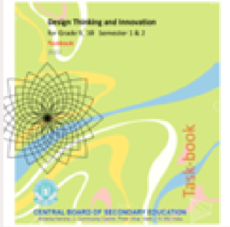
Data Science

CENTRAL BOARD OF SECONDARY EDUCATION
JOB ROLE: FIELD TECHNICIAN - OTHER HOME APPLIANCES
STUDENT TEXTBOOK
CLASS 9 & 10
Sector: ELECTRONICS AND HARDWARE

Electronics & Hardware (NEW)

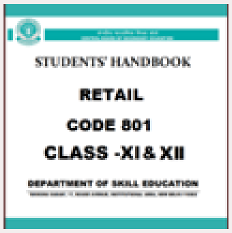
AUTOMOTIVE
LEVEL-1
Students Handbook
CLASS IX-X
CENTRAL BOARD OF SECONDARY EDUCATION

Foundation Skills For Sciences (Pharmaceutical & Biotechnology)(NEW)

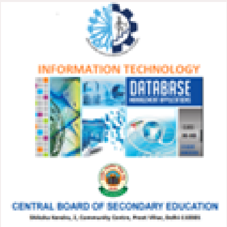

Design Thinking and Innovation
Task book
CENTRAL BOARD OF SECONDARY EDUCATION

Design Thinking & Innovation (NEW)

SKILL SUBJECTS AT SR. SEC. LEVEL (CLASSES XI – XII)


STUDENTS' HANDBOOK
RETAIL
CODE 801
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Retail


INFORMATION TECHNOLOGY
DATABASE
CENTRAL BOARD OF SECONDARY EDUCATION

InformationTechnology

Web Applications
Students Handbook
CLASS
XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

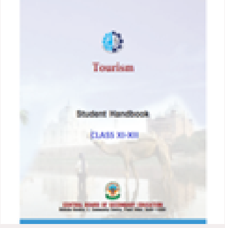
Web Application

AUTOMOTIVE
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

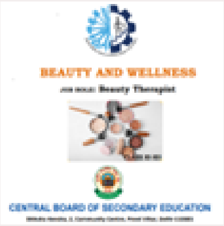
Automotive

FINANCIAL MARKETS MANAGEMENT
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

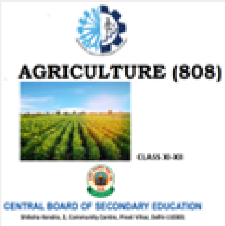
Financial Markets Management


Tourism
Student Handbook
CLASS XI-XII

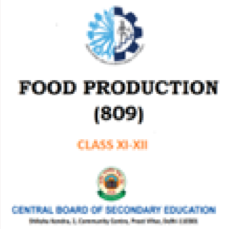
Tourism


BEAUTY AND WELLNESS
Beauty Therapist
CENTRAL BOARD OF SECONDARY EDUCATION

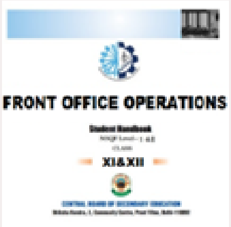
Beauty & Wellness


AGRICULTURE (808)
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

Agriculture


FOOD PRODUCTION
(809)
CLASS XI-XII
CENTRAL BOARD OF SECONDARY EDUCATION

Food Production


FRONT OFFICE OPERATIONS
Student Handbook
XI&XII

Front Office Operations

BANKING
Student Handbook
XI&XII

Banking

MARKETING
Student Handbook
XI&XII

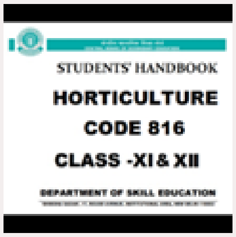
Marketing

SECTOR : HEALTHCARE
Student Workbook
CLASS XI&XII
Central Board of Secondary Education

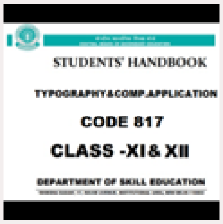
Health Care

INSURANCE
Student Handbook
XI&XII

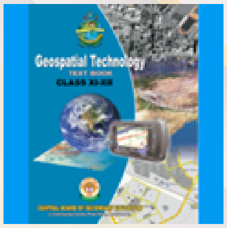
Insurance


STUDENTS' HANDBOOK
HORTICULTURE
CODE 816
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

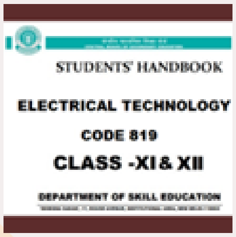
Horticulture


STUDENTS' HANDBOOK
TYPOGRAPHY&COMP.APPLICATION
CODE 817
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Typography & Comp. Application


Geospatial Technology
TEXT BOOK
CLASS XI-XII

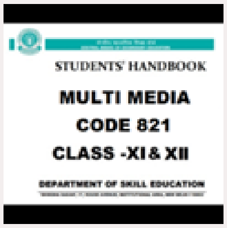
Geospatial Technology


STUDENTS' HANDBOOK
ELECTRICAL TECHNOLOGY
CODE 819
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

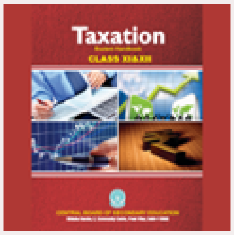
Electrical Technology

BASIC ELECTRONICS
Student Handbook
CLASS XI&XII

Electronic Technology


STUDENTS' HANDBOOK
MULTI MEDIA
CODE 821
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

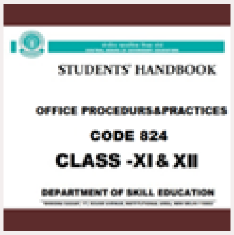
Multi-Media


Taxation
Student Handbook
CLASS XI&XII

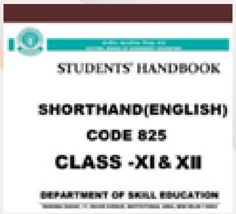
Taxation

Cost Accounting
Student Handbook
CLASS XI&XII

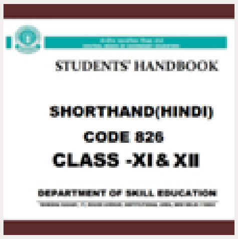
Cost Accounting


STUDENTS' HANDBOOK
OFFICE PROCEDURES&PRACTICES
CODE 824
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

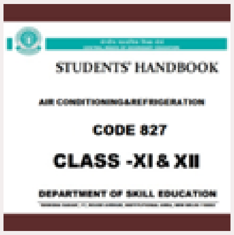
Office Procedures & Practices


STUDENTS' HANDBOOK
SHORTHAND(ENGLISH)
CODE 825
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

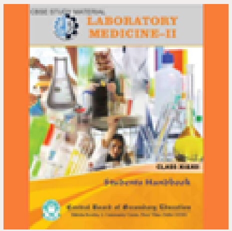
Shorthand (English)


STUDENTS' HANDBOOK
SHORTHAND(HINDI)
CODE 826
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Shorthand (Hindi)


STUDENTS' HANDBOOK
AIR CONDITIONING&REFRIGERATION
CODE 827
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

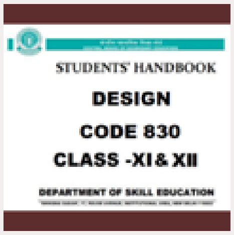
Air-Conditioning & Refrigeration


LABORATORY MEDICINE-II
CLASS XI&XII
Students Handbook

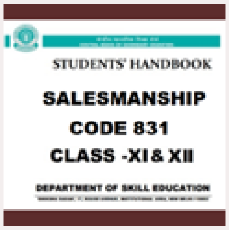
Medical Diagnostics

TEXTILE SCIENCE
Text Book & Practical Manual

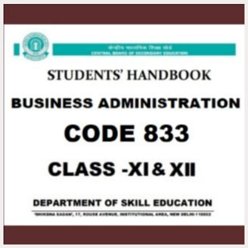
Textile Design


STUDENTS' HANDBOOK
DESIGN
CODE 830
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

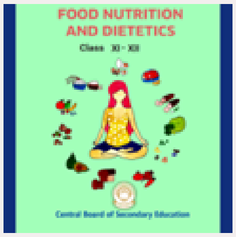
Design


STUDENTS' HANDBOOK
SALESMANSHIP
CODE 831
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

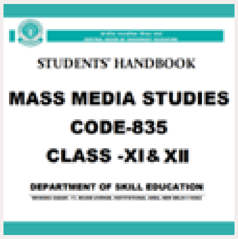
Salesmanship


STUDENTS' HANDBOOK
BUSINESS ADMINISTRATION
CODE 833
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Business Administration


FOOD NUTRITION AND DIETETICS
Class XI - XII
Central Board of Secondary Education

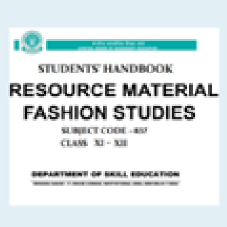
Food Nutrition & Dietetics


STUDENTS' HANDBOOK
MASS MEDIA STUDIES
CODE-835
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

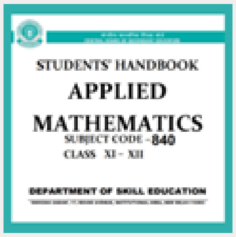
Mass Media Studies

CENTRAL BOARD OF SECONDARY EDUCATION
LIBRARY AND INFORMATION SCIENCE
CLASS XI-XII

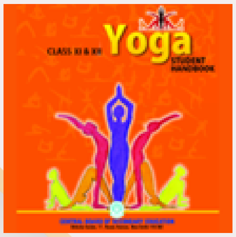
Library & Information Science


STUDENTS' HANDBOOK
RESOURCE MATERIAL
FASHION STUDIES
SUBJECT CODE - 837
CLASS XI - XII
DEPARTMENT OF SKILL EDUCATION

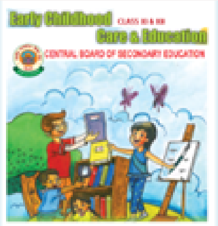
Fashion Studies


STUDENTS' HANDBOOK
APPLIED
MATHEMATICS
SUBJECT CODE - 840
CLASS XI - XII
DEPARTMENT OF SKILL EDUCATION

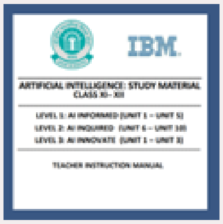
Applied Mathematics


CLASS XI & XII
Yoga
STUDENT HANDBOOK
CENTRAL BOARD OF SECONDARY EDUCATION

Yoga


Early Childhood Care & Education
CLASS XI & XII
CENTRAL BOARD OF SECONDARY EDUCATION

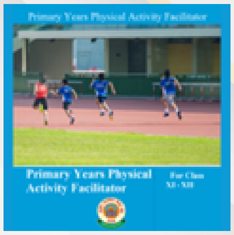
Early Childhood Care & Education


IBM
ARTIFICIAL INTELLIGENCE: STUDY MATERIAL
CLASS XI - XII
LEVEL 1: AI INFORMED (UNIT 1 – UNIT 5)
LEVEL 2: AI INQUIRED (UNIT 6 – UNIT 10)
LEVEL 3: AI INNOVATE (UNIT 11 – UNIT 13)
TEACHER INSTRUCTION MANUAL

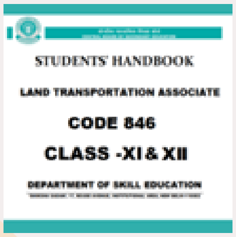
Artificial Intelligence

Microsoft
DATA SCIENCE
CLASS XI-XII

Data Science


Primary Years Physical Activity Facilitator
Primary Years Physical Activity Facilitator
For Class XI - XII

Physical Activity Trainer(new)


STUDENTS' HANDBOOK
LAND TRANSPORTATION ASSOCIATE
CODE 846
CLASS -XI & XII
DEPARTMENT OF SKILL EDUCATION

Land Transportation Associate (NEW)

Installation Technician Computing and Peripherals
Sector: Electronics and Hardware
CENTRAL BOARD OF SECONDARY EDUCATION

Electronics & Hardware (NEW)

Design Thinking and Innovation
Task-book

Design Thinking & Innovation (NEW)